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10/553,784	08/04/2006	Massimo Malavasi	108907-00043	3967
4372	7590	03/17/2011		
ARENT FOX LLP 1050 CONNECTICUT AVENUE, N.W. SUITE 400 WASHINGTON, DC 20036			EXAMINER LAUX, DAVID J	
			ART UNIT 3743	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/553,784	Applicant(s) MALAVASI ET AL.	
	Examiner David J. Laux	Art Unit 3743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6,7,10-18,21,22 and 24-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6,7,10-18,21,22 and 24-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is in response to applicant's submission dated 03/03/2011. Claim(s) 1-4, 6-7, 10-18, 21-22 & 24-33 is/are pending.

Response to Arguments

1. The declaration of Massimo Malavasi, filed 03/03/2011 is not persuasive because the submission only shows that the applicant's invention works. The rejections are based upon existing prior art under 35 USC § 103, not 35 USC § 101.
2. Applicant argues that his invention produces expected results. However, the combination '288 to Hoffert et al with '029 to Clark and '254 to Munk would produce the same results ('288: Col. 4, lines 8-13, 27-33; '288: Col. 11, lines 33-37; applicant states in paragraph 3 on page 14 that a temperature of about 1500°C is sufficient to turn any non-combustibles into slag and the combustion apparatus of '288 discloses an operating temperature of 2700°F-2800°F; Col. 12, lines 53-57; temperatures above 1200°C are sufficient to produce very low levels of TOC; see for instance US 6,848,375 to Kasin: Col. 2, lines 41-48)).
3. Applicant further argues that '288 fails to eliminate incombustible ashes in the combustor. As described above, the temperatures disclosed by '288 are sufficient to remove the incombustible particles by melting them into slag.
4. Applicant also argues that the results of practicing the invention would have been surprising and unexpected to one having ordinary skill in the art. As explained below, it would have been obvious for one having ordinary skill in the art to combine the combustion apparatus of '288 with the flue gas humidification/recirculation of '254 for

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the added benefit of reduced NO_x emissions and a more efficient combustion process and with the pure oxygen combustion parameters of '029 for the additional benefit of reduced/eliminated the production of nitrous oxide emissions. Such a combination amounts to a combining of prior art references according to known methods to yield predictable results.

5. Applicant further argues that '288 provides for no means other than through the flue gas outlet for the incombustible particles. Examiner disagrees. A clean-out opening (17) is shown in Fig. 1 for removing incombustible slag (Col. 6, lines 30-32).

6. Applicant additionally argues that in '288, the temperature of the effluent gases is somehow different than that of the combustion chamber. Since the combustion takes place within the combustion chamber, it would inherently require the temperatures in the combustion chamber to be at least as high as the gases emitted from said chamber because the total amount of thermal energy released by the combustion takes place within the combustion chamber. Furthermore, even if the temperature is somehow different (a point Examiner does not concede), the incombustible materials are supposedly entrained within the gases and the gases are at a high enough temperature that they would melt into slag, which cannot be entrained because of its tendency to stick to surfaces.

7. In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was

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within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

8. With regard to applicant's argument that Munk fails to teach opacification, opacification is an inherent measured result of the combination of flue gases and water, which is cited as being taught by Munk.

9. Applicant's remaining arguments with respect to claims 1-4, 6-7, 10-18, 21-22 & 24-33 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claim 32 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear how applicant is replacing water for the recycle gas, since applicant has previously claimed that limitation as an essential part of the claim. Appropriate action is required.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1-2, 7, 10, 28, 30 & 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 4,850,288 to Hoffert et al in view of US 6,024,029 to Clark and further in view of US 5,326,254 to Munk.

14. '288 discloses a method for the treatment of materials, in particular waste materials and refuse, comprising: supplying the material to be treated and a combustion supporter to a combustion reactor (15) (Col. 5, lines 61-66; Col. 6, lines 11-14); and discharging gases produced during the oxidation or combustion of the material from the oxidation chamber or combustion reactor (15) (Col. 6, lines 41-45), wherein the material to be treated and the products resulting from the oxidation or combustion are subjected to conditions of isothermy or quasi-isothermy at high or very high temperature (Col. 4, lines 21-23), without substantial oxygen deficit (Col. 6, lines 38-40), in any part of the reactor (15), wherein the oxidation chamber or combustion reactor is operated at a pressure from greater than atmospheric pressure to 600 kPa (Col. 6, 36-38), wherein at the mouth of the reactor the produced combustion fumes show a very low TOC and a negligible volatile ash content (abstract; Col. 4, lines 8-13, 27-33; Col. 11, lines 33-37; applicant states in paragraph 3 on page 14 that a temperature of about 1500°C is sufficient to turn any non-combustibles into slag and the combustion apparatus of '288 discloses an operating temperature of 2700°F-2800°F; Col. 12, lines 53-57; temperatures above 1200°C are sufficient to produce very low levels of TOC; see for instance US 6,848,375 to Kasin: Col. 2, lines 41-48).

15. '288 fails to disclose the combustion supporter consists essentially of oxygen and recycled gases. '029 teaches a combustion supporter that consists essentially of

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oxygen and recycled gases (Col. 3, lines 2-10, 13-18). It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '288 with the pure oxygen combustion parameters of '029 because such a combination would have produced the added benefit of reduced/eliminated the production of nitrous oxide emissions.

16. '288 fails to disclose recycled gases being supplied to the combustion reactor or water being injected into the recycled gases to raise the concentration of water in the recycled gases. '254 teaches recycling flue gases to a combustion chamber (Col. 2, lines 60-67) and water being injected into the recycled gases to raise the concentration of water in the recycled gases (Col. 1, line 66 – Col. 2, line 8). It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '288 with the flue gas humidification/recirculation of '254 because such a combination would have produced the added benefit of reduced NO_x emissions and a more efficient combustion process.

17. '288 as combined with '254 teaches the claimed invention except for the concentration of water in the recycled gases being higher than 30% per volume. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the concentration of water in the recycled gases being higher than 30% per volume, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

18. With regard to claims 2 & 7, '254 further teaches the supply of a combustion supporter comprising oxygen mixed with gases resulting from the combustion, with

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water, or with a combination of gases and water, to bring about a high degree of opacification of the combustion supporter and to ensure almost instantaneous heating of the combustion supporter that is supplied into the reactor (Col. 2, lines 60-67; it is well-known in the art, and applicant admits on page 5 of the specification, that the addition of water or steam to the products of combustion renders them opaque to infrared), wherein the recycled gases which ensure thermal balance are constituted wholly or partially by steam (Col. 1, line 66 – Col. 2, line 8). It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '288 with the flue gas recirculation of '254 because such a combination would have produced the added benefit of reduced NO_x emissions and increased opacity to infrared, which is known to increase the overall efficiency of the combustion system.

19. With regard to claim 10, '288 further discloses a method wherein in the reactor, the high rate of heating of the combustible material, in particular of its solid fraction, reduces to negligible value a fraction of dust that is entrained out of the reactor with the burnt gases (applicant states in paragraph 3 on page 14 that a temperature of about 1500 °C is sufficient to turn any non-combustibles into slag and the combustion apparatus of '288 discloses an operating temperature of 2700°F-2800°F; Col. 12, lines 53-57).

20. With regard to claim 30, '288 as previously combined with '029 further discloses oxygen is substituted with technical oxygen ('029: Col. 3, lines 2-10, 13-18; as defined by applicant, technical oxygen is the technical extent to which oxygen can be purified, so in the practical sense, the terms are synonymous).

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21. With regard to claim 32, '288 as previously combined with '029 further discloses combustion supporter that consists essentially of oxygen and water ('029: Col. 3, lines 2-10).

22. Claims 3-4, 6, 12-13 & 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over '288 in view of '029 and '254 as applied to claims 1-2 above, and further in view of US 6,848,375 to Kasin.

23. With regard to claims 3-4 & 29, '288 as combined with '254 fails to disclose the recycled gases from combustion are supplied at minimized flow-rate and/or temperature so as to minimize the overall volume of gas in the reactor for gas residence time in the reactor and to ensure the removal of a reaction heat from the reactor, wherein the mixing of the oxygen with the recycled combustion gases takes place with a concentration of more than 10% by volume and preferably more than 60% by volume, wherein the recycled gases which ensure the thermal balance of a plant that is operated continuously by removing the excess reaction heat owing to an appreciable heat enthalpy difference between the input and the output of the reactor are recycled at a minimum temperature that is compatible with normal cooling means, wherein the minimum temperature is above the dew point of the recycled gases. '375 teaches the recycled gases from combustion are supplied at minimized temperature (Col. 4, lines 38-40) so as to minimize the overall volume of gas in the reactor for gas residence time in the reactor and to ensure the removal of a reaction heat from the reactor, wherein the mixing of the oxygen with the recycled combustion gases takes place with a concentration of more than 10% by volume and preferably more than 60% by volume

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(Col. 8, lines 48-54), wherein the recycled gases which ensure the thermal balance of a plant that is operated continuously by removing the excess reaction heat owing to an appreciable heat enthalpy difference between the input and the output of the reactor are recycled at a minimum temperature that is compatible with normal cooling means (Col. 4, lines 38-40), wherein the minimum temperature is above the dew point of the recycled gases (Col. 4, lines 38-40). It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '288 as combined with '254 with the flue gas recycled percentages of '375 because such a combination would have produced the added benefit of the optimal amount of exhaust gas recycled without unacceptably reducing the performance of the combustion apparatus.

24. With regard to claims 12 & 13, '288 as combined with '254 fails to disclose a MIMO (multiple input/multiple output) control and optimization procedure which is focused on the parameters at the output of the reactor and in particular on measurement of gas composition at the output of the reactor, wherein the measurements of the gas composition are implemented with characteristic response times of about 2 seconds. '375 teaches a MIMO (multiple input/multiple output) control and optimization procedure which is focused on the parameters at the output of the reactor and in particular on measurement of gas composition at the output of the reactor (Col. 12, lines 14-20), wherein the measurements of the gas composition are implemented with characteristic response times of about 2 seconds (Col. 12, lines 16-18; discloses continuous response times). It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '288 as

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combined with '254 with the combustion data controller of '375 because such a combination would have produced the added benefit of an automated combustion process with ideal combustion conditions to maximize efficiency and reduce the creation of pollutants. Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a response time of about 2 seconds, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.

25. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over '288 in view of '029 and '254 as applied to claims 1-2 above, and further in view of US 4,022,591 to Staudinger.

26. '288 as combined with '254 fails to disclose the fused slag being cooled and solidified into beads so as to ensure that toxic heavy metals contained in the incombustible slag are rendered completely inert. '591 teaches fused slag being cooled and solidified into beads (Col. 2, lines 48-53; applicant states in the first full paragraph on page 12 that the quenching in a water bath solidifies the beads, rendering them inert) so as to ensure that toxic heavy metals contained in the incombustible slag are rendered completely inert. It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '254 as combined with '288 with the slag quencher of '591 because such a combination would have produced the added benefit of a means for disposing the liquid slag present in the combustion chamber in a safe and environmentally friendly way and would also have the added benefit of replacing the clean-out tube (17a, mistakenly as 7a in Fig. 1) of '288 with a

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completely sealed quench chamber which would prevent potentially dangerous splashing of the liquid slag to occur.

27. Claims 14, 16, 18, 21-22, 28 & 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over '288 in view of '029 and '254, and further in view of US 6,883,443 to Rettig et al.

28. '288 discloses an apparatus for the treatment of materials, in particular waste materials and refuse, comprising: a combustion reactor (15) to which the material to be treated can be supplied (Col. 5, lines 61-66) comprising: an input (18) for a combustion supporter comprising oxygen (Col. 6, lines 11-14); an output (20a) for the gases produced during the combustion of the above-mentioned material inside the reactor (15) (Col. 6, lines 41-45), wherein the combustion reactor (15) is substantially isothermic or quasi-isothermic in use at high or very high temperature (Col. 4, lines 21-23), and without substantial oxygen deficit (Col. 6, lines 38-40), in all of its parts, wherein the combustion reactor (15) is operated at a pressure from greater than atmospheric pressure to 600 kPa (Col. 6, lines 36-38), wherein at the mouth of the reactor the produced combustion fumes show a very low TOC and a negligible volatile ash content (abstract; Col. 4, lines 8-13, 27-33; Col. 11, lines 33-37; applicant states in paragraph 3 on page 14 that a temperature of about 1500°C is sufficient to turn any non-combustibles into slag and the combustion apparatus of '288 discloses an operating temperature of 2700°F-2800°F; Col. 12, lines 53-57; temperatures above 1200°C are sufficient to produce very low levels of TOC; see for instance US 6,848,375 to Kasin: Col. 2, lines 41-48).

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29. '288 fails to disclose the combustion supporter consists essentially of oxygen and recycled gases. '029 teaches a combustion supporter that consists essentially of oxygen and recycled gases (Col. 3, lines 2-10, 13-18). It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '288 with the pure oxygen combustion parameters of '029 because such a combination would have produced the added benefit of reduced/eliminated the production of nitrous oxide emissions.

30. '288 fails to disclose water being injected into recycled gases to raise the concentration of water in the recycled gases. '254 teaches water being injected into the recycled gases to raise the concentration of water in the recycled gases (Col. 1, line 66 – Col. 2, line 8). It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '288 with the flue gas humidification/recirculation of '254 because such a combination would have produced the added benefit of reduced NO_x emissions and a more efficient combustion process.

31. '288 as combined with '254 teaches the claimed invention except for the concentration of water in the recycled gases being higher than 30% per volume. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the concentration of water in the recycled gases being higher than 30% per volume, since it has been held that discovering an optimum value as a result effective variable involves only routine skill in the art.

32. '288 fails to specifically disclose the quench gas being recirculated flue gas. '443 teaches the use of recirculated flue gas as a quench gas (Col. 5, line 65 – Col. 6,

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line 11). It would have been obvious for one skilled in the art at the time of invention to combine the combustion gas quenching means of '288 with the use of recirculated flue gas as the quench gas of '443 because such a combination would have produced the added benefit of an efficient and readily available means of reducing the temperature of the combustion gases to a useable level with the added benefit of not diluting or increasing the volume of the flue gases.

33. With regard to claim 16, '288 further discloses a means (30) for cooling the gases produced during combustion (Col. 8, lines 1-5). '288 fails to disclose a means for withdrawing and recycling a portion of the said cooled gases being provided for mixing the oxygen at the input to the reactor and producing a combustion-supporting mixture which is opaque to infra-red. '254 teaches a means (230) for withdrawing and recycling a portion of flue gases being provided (Col. 2, lines 60-67) for mixing the oxygen at the input to the reactor and producing a combustion-supporting mixture (Col. 2, lines 64-67) which is opaque to infra-red (it is well-known in the art, and applicant admits on page 5 of the specification, that the addition of water or steam to the products of combustion renders them opaque to infra-red). It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '288 with the flue gas recirculation of '254 because such a combination would have produced the added benefit of reduced NO_x emissions and increased opacity to infrared, which is known to increase the overall efficiency of the combustion system.

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34. With regard to claim 18, '288 further discloses a means (30) for mixing a quench gas with the gases output from the reactor prior to entry of the gases into the cooling means (Col. 8, lines 1-5).

35. With regard to claim 21, '288 discloses the claimed invention except for a plurality of feeders for supplying different materials to the reactor. It would have been obvious to one having ordinary skill in the art at the time the invention was made to add an additional number of feeders to supply materials to the reactor, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art.

36. With regard to claim 22, '288 further discloses at least one propulsion chamber for the pressurized and discontinuous supply of solid materials in pieces into the reactor (Col. 10, lines 35-39), said propulsion chamber comprising a duct (117) for the supply of gas under pressure (Col. 10, lines 35-39). '288 fails to disclose the pressurized gas being withdrawn from the output line. '288 does, however, contemplate the use of flue gases to preheat the solid fuel in the pressurized conduit through the use of a heat exchanger (Col. 10, lines 50-54). Given the exhaust gas/steam recirculation method taught by '254, it would have been obvious to replace the indirect method of preheating the fuel with a direct injection of the flue gas/steam recirculated gases because such a combination would have produced the added benefit of a more efficient way to inject the gases and fuel and would have allowed for a better mixing of the products upon entry into the combustion chamber by pre-mixing them in a fuel feed/flue gas recirculation chamber.

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37. With regard to claim 33, '288 as previously combined with '029 further discloses oxygen is substituted with technical oxygen ('029: Col. 3, lines 2-10, 13-18; as defined by applicant, technical oxygen is the technical extent to which oxygen can be purified, so in the practical sense, the terms are synonymous).

38. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over '288 in view of '029 and '254, as applied to claim 14 above, and further in view of US 6,145,452 to Heger et al.

39. Although '288 discloses the walls of the combustion chamber being made of a refractory material (Col. 5, lines 56-60), '288 fails to specifically disclose the walls of the reactor comprising a ceramic lining material which participates in the isothermy or quasi-isothermy of the reactor. '452 teaches walls of a reactor comprising a ceramic lining material which participates in the isothermy or quasi-isothermy of the reactor (Abstract). It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '288 with the ceramic insulation of '452 because the ceramic insulation of '452 is capable of withstanding temperatures of over 3000 °F which the combustion chamber of '452 requires and could have been used instead of the unspecified refractory material of disclosed by '452.

40. Claims 17 & 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over '288 in view of '029 and '254, as applied to claim 16 above, and further in view of '375.

41. '288 as combined with '254 fails to disclose the cooling means comprising means for recovering energy from a high enthalpy value of the gases output from the reactor or a sensor means for measuring output parameters of the reactor, a control and

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management system receiving the signals of the sensor means in order substantially to improve the number of effective predictions for intervention in the operating conditions of the plant and to control fluctuations due to the non-homogeneity of the materials that are supplied into the reactor. '375 teaches a cooling means comprising means (71) for recovering energy from a high enthalpy value of the gases output from the reactor (Col. 7, lines 48-50) and a sensor means for measuring output parameters of the reactor (Col. 12, lines 14-20), a control and management system receiving the signals of the sensor means in order substantially to improve the number of effective predictions for intervention in the operating conditions of the plant and to control fluctuations due to the non-homogeneity of the materials that are supplied into the reactor (Col. 12, lines 14-20). It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '288 as combined with '254 with the control system of '375 because such a combination would have produced the added benefit of an automated combustion process with ideal combustion conditions to maximize efficiency and reduce the creation of pollutants.

42. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over '288 in view of '029 and '254, as applied to claim 14 above, and further in view of '591.

43. '288 fails to disclose a reactor comprising a base portion communicating with and inclined towards a heated duct for collecting fluid slag, wherein the collecting duct communicates with a container for collecting the fluid slag which is cooled rapidly in a water bath with the formation of solid beads so as to form a dilute slurry, wherein the collecting duct comprises heating means for keeping the slag fluid. '591 teaches a

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reactor (10) comprising a base portion (12) communicating with and inclined towards a heated duct (10b) for collecting fluid slag (Col. 3, lines 25-38), wherein the collecting duct (10b) communicates with a container (12) for collecting the fluid slag which is cooled rapidly in a water bath with the formation of solid beads so as to form a dilute slurry (Col. 3, lines 25-38), wherein the collecting duct (10b) comprises heating means for keeping the slag fluid (Col. 3, lines 25-29). It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '288 with the quench chamber of '591 because such a combination would have produced the added benefit of a means for disposing the liquid slag present in the combustion chamber in a safe and environmentally friendly way and would also have the added benefit of replacing the clean-out tube (17a, mistakenly as 7a in Fig. 1) of '288 with a completely sealed quench chamber which would prevent potentially dangerous splashing of the liquid slag to occur.

44. Claim 31 rejected under 35 U.S.C. 103(a) as being unpatentable over '288 in view of '029 and '254 as applied to claim 1 above, and further in view of US 4,993,332 to Boross et al.

45. '288 fails to disclose the solid fuel is introduced into the combustion reactor by using recycled gas under pressure withdrawn from the output line of the reactor. '332 teaches solid fuel being introduced into the combustion reactor by using recycled gas under pressure withdrawn from the output line of the reactor (Col. 4, lines 20-22, 31-34). It would have been obvious for one skilled in the art at the time of invention to combine the combustion apparatus of '288 with the flue gas fuel transport of '332 because such a

combination would have produced the added benefit of preheating the fuel prior to being admitted into the combustion chamber.

Conclusion

46. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David J. Laux whose telephone number is (571) 270-7619. The examiner can normally be reached on M-F 9:00-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Rinehart can be reached on (571) 272-4881. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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March 9, 2011

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